

REMARKS

Reconsideration of the above-identified application, as amended, is respectfully requested.

In the Office Action of June 27, 2005, the Examiner first objected to Claims 1-3 as reciting terms having alleged lack of antecedent basis. In response, applicants have addressed each of the Examiner's objections by amending these claims appropriately. The Examiner is respectfully requested to remove the objections to amended Claims 1, 2 and 3.

Further in the Office Action, the Examiner rejected Claims 1-2, 4-7 and 9-11 under 35 U.S.C. §103(a), as being allegedly unpatentable over Sugawara et al. (U.S. 5,438,421) in view of Bryan-Brown et al. (U.S. Patent No. 5,917,570). In the present Official Action, Claims 3 and 8 were further rejected based upon the combination of Sugawara in view of Bryan-Brown and in further view of Callegari et al. (U.S. Patent No. 6,020,946).

In response to the rejection of independent Claim 1, Applicant amends Claim 1 to set forth a liquid crystal display (LCD) device comprising: a first substrate having a grooved surface profile; and, an alignment film layer of inorganic or organic material formed on said grooved surface and having said grooved surface profile, said alignment film of inorganic or organic material being subject to an ion beam incident to said grooved surface in a direction parallel to a groove direction to thereby generate increased alignment force for constraining deposited LC material to a desired direction; and, a second substrate aligned opposite said first substrate for forming a plurality of LCD cells having the liquid crystal (LC) material deposited therein, wherein LC molecules align parallel to the grooves for enhanced LCD performance.

In the first instance, it is clear that Claim 1 is being clarified to set forth that the

alignment film of inorganic or organic material is subject to an ion beam treatment incident to said grooved surface in a direction parallel to a groove direction (See specification at page 5, para. 0020).

Moreover, Claim 1 is being amended to set forth the advantageous results from the Ion Beam treatment that an increased alignment force is generated to constrain deposited LC material to a desired direction. This increased alignment force, it is submitted, is a result of the ion beam treatment that enables avoidance of weak anchoring and 90 degree meta-stable states in liquid crystal (LC) material alignment. New Claim 18 is being added to set forth that that subjecting said alignment film to said incident ion beam in a direction parallel to a groove direction avoids weak anchoring and 90 degree meta-stable states in liquid crystal (LC) material resulting in said increased alignment force that constrains deposited LC material to a desired direction (See specification at page 4, end of para. (0013) and at page 6, para. (0023)).

Respectfully, no new matter is being entered by this amendment as full support for these added limitation is clearly found in the specification.

It is respectfully submitted that Claim 1 as amended is further clearly distinguishable over the combination of Sugawara and Bryan-Brown, whether taken alone or in combination.

Both of these cited prior art references appear to suggest use of ion beam (IB) treatment to shape the form of the surface of the film. These teachings do not contemplate use of IB treatment for the purposes of creating better LC material alignment and more stability of LC material (for enhanced performance) as used in the present invention as claimed.

Thus, for example, contrary to the Examiner's citation of Sugawara (Fig. 5(c), col. 11, line 55), the arrows indicated in Figure 5(c) of Sugawara indicate ion beam treatment for the purposes of etching, not alignment. Moreover, the arrows shown in Figure 5(c) appear

perpendicular or transverse to the grooves (i.e., provides the etching to form the groove profile). This is not what IB treatment in the present invention is intended to provide as now claimed in amended Claim 1.

Respectfully, Bryan-Brown is of no help in this regard. Bryan-Brown pretreats surface with bigrating to achieve a surface pre-tilt. The "exposure" described in Bryan-Brown is a light exposure and development to form a bigfating in the surface of the resist to form having asymmetric grooves profile such that a desired pre-tilt angle is achieved (see Bryan-Brown, col. 5, lines 29-45. By making the grooves asymmetric various degrees of pre-tilt (of LC material are achievable near the grooved profile surface (See Fig. 5a) according to the application and LC material used. Respectfully, the combination of Sugawara and Bryan-Brown does not teach or suggest the structure and method of the present invention and the Examiner is respectfully requested to withdraw the rejection of amended Claim 1 under 35 U.S.C. §103(a) and to withdraw the rejection of all claims dependent upon Claim 1 by virtue of their dependency. Moreover, the combination of Sugawara and Bryan-Brown does not teach or suggest the structure of the present invention and the subject matter of new Claim 18 and allowance thereof is respectfully solicited.

In view of the foregoing remarks herein, it is respectfully submitted that this application is in condition for allowance. Accordingly, it is respectfully requested that this application be allowed and a Notice of Allowance be issued. If the Examiner believes that a

telephone conference with the Applicants' attorneys would be advantageous to the disposition of this case, the Examiner is requested to telephone the undersigned.

Respectfully submitted,



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